

REMARKS/ARGUMENTS

Abstract

The abstract of the PCT application has been replaced by a new abstract on a separate sheet as required by the Examiner. If the new abstract is still defective in any way, applicant requests specific guidance as to its deficiencies.

Claim Rejection - 35 USC § 112

Claim 29 has been amended to remove the offending language.

Claim Rejections - 35 USC § 102

Claims 1, 4, 14, 15, and 42 have been rejected as anticipated by Guevel et al, U.S. Patent 4,840,021 (Guevel).

Claim 1 as filed recites, “A yarn comprising an inner portion of spun staple fibers of recycled plastic and an outer portion comprising a different material.” Guevel relates to a sewing thread which is strengthened by simultaneously spinning core filaments 3, cover filaments 4, and wrapping filaments 5 into a thread. The wrapping filaments 5 comprise a small proportion of the total thread, and “the main function of wrapping yarn 5 is to lock the staple fibers of cover 4 to cancel their corrosion during passage in the eye of the sewing needle.” (Col. 3, lines 19-22.) Guevel discloses nothing about using recycled plastic in the thread and does not appear to disclose using a different material for the outer portion of his thread. (The exact polyester comprising Trevira T712 and Trevira T132 in the Example is not known to the undersigned, but both are presumed to be polyester.) In any event, claim 1 has been amended, without prejudice to re-introducing original claim 1 in a continuing application, to recite “the outer portion

covering from 70% to 100% of the surface of the inner portion." This language is taken from page 12, line 29, to page 13, line 3 of the specification. As described in the present application, this covering of the rough recycled plastic with a covering yarn improves the hand of the finished yarn and may improve other characteristics, such as abrasion resistance. It is believed that nothing in Guevel, taken alone or in combination with the other art of record, shows or suggests the yarn as set out in claim 1. Claims 4, 14, and 15 are all dependent on claim 1 and are believed to be allowable with it.

Claim 42 recites a method of forming a yarn comprising "forming an intermediate yarn by feeding a first staple fiber into a spinning device to form a sheath of the first staple fiber over the core, and thereafter forming at least one helix of a continuous yarn around the intermediate yarn." Guevel forms his thread in a single spinning step, simultaneously bringing core filaments 3, cover filaments 4, and wrapping filaments 5 to drawing rolls 11. Nothing in this reference, or in the other references of record taken alone or in combination, is believed to show or suggest the method set out in claim 42.

Claim Rejections - 35 USC § 103

All the remaining claims (claims 2, 3, 5-13, 16-18, 20-41, and 43-50) have been rejected as obvious over Guevel in view of Pepin, U.S. Patent 5,487,941.

As previously indicated, Guevel is directed to a sewing thread having core filaments, cover filaments, and wrapping filaments. The thread is produced entirely on a spinning machine, adding an additional bobbin for the wrapping filaments. This produces a thread in which the core, cover and wrapping

filaments all have the same "rate of torsion." As noted above, the main function of wrapping yarn 5 is to lock the staple fibers of cover 4.

Pepin is directed to a "continuous/discontinuous" ("CD") yarn (twisted) or tow (untwisted) precursor composite for use in fiber-reinforced composite structures molded under heat and pressure. The CD yarn comprises intermixed discontinuous high-temperature structural filaments (like E-glass) with continuous thermoplastic filaments. "Upon molding, the intermixing of continuous thermoplastic filaments with the discontinuous structural reinforcing filaments allows the continuous/discontinuous filament (CD) yarn or tow to stretch along its length as the thermoplastic filaments melt." (Col. 2, lines 5-9.) In one embodiment (Figs. 11 and 12), a CD tow is held together by a "binder" consisting of a thread helically wrapped around the tow. Pepin discloses that the continuous thermoplastic filaments may be "polyethyleneterephthalate (PET) tows spun from recycled soft drink bottles by Hills R & D of Melbourne, Fla." (Col. 10, lines 40-41.)

Pepin is cited by the Examiner merely for the proposition that "using such recycled fibers, inherently possessing such an inability of passing [through a twenty micron opening without clogging], from beverage bottles in a yarn structure is well known."

Applicant notes that Pepin's use of the recycled PET to produce continuous filaments strongly suggests that the PET has been processed to remove impurities, even given the limited function of the PET filaments as discussed below, and therefore does not concede that the material inherently possesses the inability to pass through a twenty micron opening without clogging.

Applicant concedes, however, that the broad concept of using recycled PET in a yarn is old. Those skilled in the art have been trying for many years to figure out how to incorporate such recycled material into a yarn in a commercially acceptable way. Applicant has discovered such a way, producing a yarn that overcomes the inherently poor hand, poor abrasion-resistance, and poor strength properties of the recycled fiber. This is a major breakthrough, and one that deserves patent protection. It is believed that claim 1 and the other pending claims particularly point out and distinctly claim the subject matter of the present invention in a way that clearly distinguishes over the art.

Absent applicant's disclosure, neither Guevel nor Pepin, taken alone or together, gives any suggestion of how the problems inherent in the use of recycled plastic could be solved. Guevel is not concerned with the problem at all. Pepin does not appear to care about any of these poor characteristics of recycled PET because he is making a highly specialized tow (or yarn) in which the continuous thermoplastic PET filaments merely need to hold the discontinuous structural filaments aligned as they slide into overlapping positions when the PET melts in the molding process. Nothing in Pepin or Guevel suggests that the continuous PET filaments of Pepin would have any use in the sewing thread of Guevel. Further, even if such a combination were made, it would not be the structure now called for in claim 1.

Claims 2, 3, 5-13, and 16-18 are dependent on claim 1 and are believed to be allowable with it. These claims also add further features which, in the combination claimed, are not suggested by the art.

Claim 20 calls for, "A yarn comprising an inner portion of spun staple fibers and an outer portion comprising an inner helix and an outer helix formed of a material different from the inner helix." Nothing in the cited art shows or suggests anything like this structure, and the Examiner has made no rejection even purporting to apply the art.

Claim 21 calls for, "A yarn comprising two spun staple fibers of different material, the first staple fibers being longer than the second staple fibers, the second staple fibers forming a major part of the surface of the yarn." Nothing in the cited art shows or suggests anything like this structure.

Claim 22 calls for, "A yarn comprising a core formed of at least one strand of a continuous filament having a tenacity of at least about five grams per denier, a sheath of staple fibers surrounding the core, and a cover comprising an inner helix and an outer helix." Nothing in the cited art shows or suggests anything like this structure.

Claims 23-27 are dependent on claim 22 and are believed to be allowable with it. They add further features which, in the combination claimed, are not suggested by the art.

Claim 28 calls for, "A method of forming a yarn containing staple fibers of PCR plastic, comprising spinning a plastic-surfaced yarn from the staple fibers of PCR plastic, and thereafter forming a cover over the plastic surfaced yarn." Applicant's use of a spinning machine, followed by the use of a separate covering machine, in the manner set out, is believed to be both new and unobvious. It is certainly not shown or suggested by the cited art.

Claim 29 is directed to another embodiment of the invention. It calls for, "A yarn comprising a high strength fasciated yarn comprising two spun staple fibers of different materials, the first being synthetic and not moisture absorbent and longer than the second fibers, the second fibers forming a major part of the yarn surface." The cited art appears to be totally unrelated to the subject matter of this claim.

Claim 30 calls for, "A method of producing a spun yarn comprising two layers of sheath over a continuous core, the method comprising simultaneously feeding two different staple fibers into a spinning device to simultaneously form the two layers over the core, one of the layers being predominantly one of the staple fibers, and the other layer being predominantly the other." Nothing in the cited art shows or suggests this method.

Claims 31-34 are dependent on claim 30 and are believed to be allowable with it. They also add features which, in the claimed combination, are unsuggested by the art of record.

Claim 35 calls for, "A method of producing a spun yarn comprising two layers of sheath over a continuous filament core, the method comprising forming an intermediate yarn by feeding a first staple fiber into a spinning device to form a sheath of the first staple fiber over the core, and thereafter feeding a second staple fiber into a spinning device to form a sheath of the second staple fiber over the intermediate yarn." Nothing in the cited art shows or suggests such a method, for the reasons previously enunciated.

Claims 36-39 are dependent on claim 35 and are believed to be allowable with it. They also add features which, in the claimed combination, are unsuggested by the art of record.

Claim 40 calls for, "A corespun yarn comprising a core and two sheaths over the core, the first sheath being formed of spun staple fibers of different compositional makeup than the second sheath." Again, nothing in the cited art shows or suggests such a yarn.

Claim 41 is dependent on claim 40 and adds additional features not shown or suggested by the cited art. It is therefore believed to be allowable.

Claim 42 has been discussed above in relation to the rejection under 35 USC § 102. Claims 43 and 44 are dependent on it and are believed to be allowable with it, as well as adding new features which are believed to be unobvious in the combination claimed.

Claim 45 calls for, "A continuous and multi-filament yarn having a total denier of 12-800 and comprising 10-90% by weight of continuous high tenacity and high modulus monofilaments having a tenacity higher than 15 and a modulus higher than 500, intermingled with continuous lower tenacity and lower modulus monofilaments having a tenacity between 5 and 15." This claim, directed to an embodiment of the core of the present invention, is neither shown nor suggested by the cited art.

Claims 46-48 are dependent on claim 45 and are believed to be allowable with it. They also add additional features which are believed to be new and unobvious in the claimed combination.

Claim 49 calls for, "A yarn comprising an inner portion of spun staple fibers of recycled plastic and an outer portion comprising a continuous filament helix." Like claim 1, this claim has now been amended to call for "the outer portion covering from 70% to 100% of the surface of the inner portion," this amendment being made without prejudice to applicant's right to resubmit original claim 49 in a continuing application. It is believed to be patentable for reasons similar to those discussed above with respect to claim 1.

Claim 50 is dependent on claim 49 and is believed to be patentable with it. It adds the continuous filament core, a feature which is believed to be new and unobvious in the combination set out.

It is respectfully requested that the case be passed to issue. Should the Examiner have questions or suggestions, he is urged to call applicants' undersigned attorney at 314-238-2400, extension 426.

The Commissioner is hereby authorized to charge any additional fees or credit overpayment under 37 CFR 1.16 and 1.17 which may be required by this paper to Deposit Account 162201.

Respectfully submitted,

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